room application. The criterion of a well controlled installation is one which has neither too few nor too many controls. (See Chapter 34).

With the expansion of cities during the past decade, the problem of water supply has become a costly and ever present problem[5]. Consequently, laws are appearing designed to restrict the usage of water wherever possible, particularly when substitute means are available. Evaporative condensers and cooling towers (described in Chapters 25 and 27) are means devised to save large quantities of water in this connection. Most manufacturers furnish equipment designed for use in combination with these water savers.

Municipal plumbing, heating, electrical and refrigeration codes, as well as fire underwriter restrictions, are likewise having their effects on the application of unit air conditioners. Meeting municipal and national code requirements should be an important item in connection with the installation of any unit equipment.

Ratings

There are two codes governing the rating and testing of unit air conditioners. The first code, Standard Method of Rating and Testing Air Conditioning Equipment[6], covers all types of air conditioning units except the self-contained type. The latter is covered by the second code, The Standard Method of Rating and Testing Self-Contained Air Conditioning Units for Comfort Cooling[7]. The two codes are necessary because of the basic difference caused by the heat given up by the self-contained units. The standard rating conditions for self-contained unit air conditioners, as given in the code, are set forth in Table 1.

The standard rating of a self-contained unit for the conditions specified in Table 1 include all items which apply to the function of a unit as: (1) name of unit, (2) functions which unit performs, (3) data on cooling, (4) data on heating, (5) data on air flow, and (6) data on humidification.

The standard rating conditions for unit air conditioners, other than the self-contained type, are identical to those in Table 1 except the entering wet-bulb temperature for cooling is expressed as 50 per cent relative humidity (66.7 F wet-bulb) instead of 67 F wet-bulb temperature. In addition, the saturated suction refrigerant temperature for comfort cooling is specified at 40 F. This condition is omitted from Table 1 for self-contained units as immaterial in the rating of a unit that includes the evaporator and condensing unit.

UNIT AIR COOLERS

This type of unit is primarily intended to perform the main function of cooling air, with humidity control a secondary function within the limitations of the design. The main application of this equipment is in process and product refrigeration such as cold storage warehousing, fruit and

[5]Concerning Conservation of Underground Water with Suggestions for Control, by Noel E. Porter (A.S.H.V.E. TRANSACTIONS, Vol. 47, 1941, p. 309).
[6]Loc. Cit. Note 1.
[7]Loc. Cit. Note 2.

TABLE 1. STANDARD RATING BASIS FOR SELF-CONTAINED AIR CONDITIONING UNITS

FUNCTIONS	TYPES OF UNITS	RATING CONDITION		
		Item	Description	Value
All	All	a	Barometric Pressure	29.92 in. Hg.
Cooling	Water-Cooled, Air-Cooled and Evaporatively Cooled Condensers	b	Unit Ambient and Air Entering Room—Air Inlet (1) Dry-Bulb (2) Wet-Bulb	 80 F 67 F
		c	Ventilation Air	See Note
	Water-Cooled Condensers	d	Water Temperature Entering Unit	75 F
		e	Water Temperature Leaving Unit	95 F
	Air-Cooled and Evaporatively Cooled Condensers	f	Air Entering Outside Air Inlet (1) Dry-Bulb (2) Wet-Bulb	 95 F 75 F
Heating	All Types Provided with Heating Function	g	Unit Ambient and Total Air Entering Unit	70 F
		h	Heating Medium, Pressure or Temperature (1) Dry Saturated Steam (2) Water In (3) Water Out	 16.7 lb per sq in. abs. 180 F 160 F
Humidifying	All Types Provided with Humidifying Function	i	Unit Ambient	70 F
		j	Total Air Entering Unit (1) Dry-Bulb (2) Wet-Bulb	 70 F 53 F
Air Circulation	All	k	Filters	New and Clean

Note: Rating shall be based on both ventilation and recirculated room air entering at 80 F dry-bulb and 67 F wet-bulb temperature. (The *Note* as given in the code has been condensed in order to remove material not pertinent to this chapter).

vegetable packing, in breweries, and in wholesale and retail food markets; although some comfort cooling may be obtained by the use of a unit similar in design to this type of unit as previously explained and as illustrated by Fig. 6.

Application of the unit method of air cooling with mechanical circulation is comparatively recent, being an improvement over the pipe or finned coil, which depended on gravity for circulation. Bunkers were sometimes constructed around the coils to direct the air flow and sometimes fans were used for forcing air over the coils. The location of the unit air cooler is usually within the refrigerated area, but the larger, blower type models may be remotely located.